MEC Software

Barcode Font Kit

TrueType® Format

Code 39 (3 of 9)

User Manual

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MEC Software
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Installing the Fonts

1. Click on Start -> Settings -> Control Panel -> Fonts to display the font manager window:

2. On the menu bar, click on File -> Install New Font.

3. Browse to the fonts on the release CD-ROM. The system will take a moment to scan the directory and list the fonts.

4. Click Select All

5. Click OK.

This will install the Code 39 barcode fonts on your system. You will be able to add barcodes to just about any Windows application, including word processors, spreadsheets, and databases.

Creating Code 39 Barcodes

Code 39, also known as Code 3 of 9, is a very useful general-purpose barcode. It is in wide use and can be read by almost every barcode scanner anywhere in the world. The Code 39 character set includes letters, numbers, and some symbols:

- upper case letters A-Z
- digits 0-9
- space
- hyphen (-)
- period (.)
- dollar sign ($)
- forward slash (/)
- plus sign (+)
- percent symbol (%)

Code 39 is variable length, so a single barcode can contain any reasonable number of characters. In practice, barcodes with more than 15 or 20 characters begin to be a little long. The point size used to print a barcode must be large enough so that the scanner can resolve the individual bars; 24 points is a good starting point. Bear in mind that inkjet images tend to spread a little bit, so you may not be able to make very small barcodes with this type of printer. As to the maximum length of a barcode, remember that many of the scanners in common use are CCD devices with fixed maximum widths (3 inches is typical).

Code 39 barcodes do not normally require any special formatting or checksum calculation (see the section on the Modulo 43 checksum later in this manual), but they do have to start and end with a special start/stop character which is represented by an asterisk (*). Just print the barcode data with an asterisk at each end, using the Code 39 font.

For example, here is a text string printed with a normal text font and, to the right, printed with a Code 39 font:

ABCD1234 

This will be read by the scanner as ABCD1234. Without the asterisks the barcode will not scan; be sure that the asterisks as well as the data are printed with the Code 39 font. Never use bold, italic, or any other special character effects.

The space character requires special handling. When Windows sees a space character in a text string, it inserts a blank white spot in the printout. For example, the following barcode has a space character in the middle:

ABCD 1234 

This is not good for a barcode; we need a pattern of bars to represent the space. When a space is required in the barcode, use the underscore character (_) instead. It is automatically translated by the font into the correct Code 39 barcode character for a space.

ABCD_1234 

Lower case letters a-z are not part of the Code 39 character set, but they are automatically translated to upper case characters by the font. If the printed barcode includes rectangles or blank

spaces in place of some bars, the data probably includes characters which are not part of the standard Code 39 selection.

Examples include non-printable control codes, printable symbols other than -.$/+%, and extended character codes (çèêõá, for example). If special characters are needed, see the section on Extended Code 39 later in this manual.

Barcodes may be inserted in almost any type of Windows-based software, including spreadsheets, word processors, and database reporting programs. In a word processor, the typical method is to simply type an asterisk, the data, and another asterisk; highlight the string, choose a Code 39 font, and set the point size.

If you are using Microsoft Word 2000, you will have to turn off an auto-formatting "feature" that treats a pair of asterisks as a command to format the enclosed data as Bold text. For example, if you type the following characters *ABCD1234* but they are automatically converted to **ABCD1234** then you need to turn off Microsoft's Auto-Format option which treats asterisks as Bold format commands. On the Word menu bar, click on Format --> AutoFormat --> Options; uncheck the **Bold* and _Italic_ with real formatting* checkboxes on the *AutoFormat* and *AutoFormat as You Type* property pages.

To print a barcode on a Microsoft Access report, add a text field to the report and select a Code 39 font and set the point size. On the properties page for the text field, the Control Source property would normally contain the name of the database field which will provide the data for this field. For example:

Control Source: `[PartNumber]`

Edit the Control Source to add fixed asterisks before and after the data. The final string should look like this:

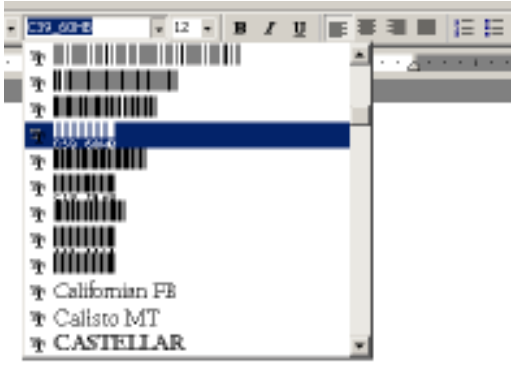
Control Source: `="*"&[PartNumber]&"*"`

The same sort of thing can be done in spreadsheets, report generating programs, and software code. Some programs use the + sign instead of the & used by Access:

```
"*"+[PartNumber]+"*"
```

Selecting a Barcode Font

Once installed on your system, the Code 39 fonts will appear on the list of all available fonts. You can select the barcode font you want just like you select any other font. For example, here is the list of fonts as displayed by Microsoft Word:



Some programs (including Microsoft Word) display the list of fonts using the fonts themselves, making it difficult to see exactly which barcode font you are selecting. Once you select a font, its name is normally displayed in plain text in the font selection field on the menu bar.

Fonts included in the kit

The kit includes several different fonts. By choosing from among the fonts and then adjusting the point size at which the barcode is printed, it is possible to obtain a wide range of barcode sizes. The font files are named according to the following convention:

C39 <size> <density> <text> .ttf

Every Code 39 filename begins with C39. Size is the percentage of total character height used by the bars. For example, 80 indicates that the bars account for 80% of the total height, leaving 20% for the text characters.

Density refers to the ratio between the widths of narrow bars and wide bars, which may range from 2.0 to 3.0. H = high density (2.0 ratio), M = medium density (2.5 ratio), and L = low density (3.0 ratio). Text refers to the location of the readable text characters. A = above the bars, B = below the bars, and N = no text. For example, file C3980HB.TTF contains a font in which the bars occupy 80% of the total height, the bars are high density, and text is located below the bars. Here are some samples of the fonts which include text below the barcode; all are printed at 36 point size::

C3980HB.TTF (36pt)

C3970HB.TTF (36pt)

C3960HB.TTF (36pt)

Here are samples of the fonts which do not include text printed at various point sizes

C3920HN.TTF (10pt)

C3930HN.TTF (12pt)

C3940HN.TTF (18pt)

C3950HN.TTF (22pt)

C3960HN.TTF (24pt)

C3970HN.TTF (32pt)

C3980HN.TTF (36pt)

Extended Code 39

At times it may be necessary to encode a character which is not part of the normal Code 39 character set. “Extended Code 39” or “Full ASCII Code 39” is a method that allows encoding of all 128 ASCII characters. These barcodes must be read using a scanner which has been configured for Extended Code 39. The official AIM specification for Code 39 lists Extended Code 39 as an Optional Characteristic and uses the following language:

“Readers can be programmed to respond to Code 39 symbols in non-standard ways to satisfy particular application requirements... Since use of these features requires special reader programming, they are not recommended for general applications where there would exist the possibility of ambiguity of interpretation with standard Code 39 symbols.”

The upper case alphabet, the digits 0 through 9, the space, the dash (-), and the period (.) are encoded just like standard Code 39. All others are encoded with a pair of barcode characters. The percent sign (%), dollar ($), slash (?), and plus sign (+) are followed by a second character; for example, the pair $M will be scanned as a carriage return code. The scanner must be configured to read Extended Code 39.

Extended Code 39 character codes

ASCII	C39	ASCII	C39	ASCII	C39	ASCII	C39
NUL	%U	SP	_	@	%V	‘	%W
SOH	$A	!	/A	A	A	a	+A
STX	$B	“	/B	B	B	b	+B
ETX	$C	#	/C	C	C	c	+C
EOT	$D	$	/D	D	D	d	+D
ENQ	$E	%	/E	E	E	e	+E
ACK	$F	&	/F	F	F	f	+F
BEL	$G	‘	/G	G	G	g	+G
BS	$H	(	/H	H	H	h	+H
HT	$I	)	/I	I	I	i	+I
LF	$J	*	/J	J	J	J	+J
VT	$K	+	/K	K	K	k	+K
FF	$L	,	/L	L	L	l	+L
CR	$M	-	-	M	M	m	+M
SO	$N	.	.	N	N	n	+N
SI	$O	/	/O	O	O	o	+O
DLE	$P	0	0	P	P	p	+P
DC1	$Q	1	1	Q	Q	q	+Q
DC2	$R	2	2	R	R	r	+R
DC3	$T	4	4	S	S	s	+S
DC4	$T	4	4	T	T	t	+T
NAK	$U	5	5	U	U	u	+U
SN	$V	6	6	V	V	v	+V
ETB	$W	7	7	W	W	w	+W
CAN	$X	8	8	W	W	w	+W
EM	$Y	9	9	Y	Y	y	+Y
SUB	$Z	:	/Z	Z	Z	z	+Z
ESC	%A	;	%F	[	%K	{	%P
FS	%B	<	%G	\	%L	|	%Q
GS	%C	=	%H	]	%M	}	%R
RS	%D	>	%I	^	%N	~	%S
US	%E	?	%J	_	%O		
DEL	%T, %X, %Y, %Z						

Modulo 43 Checksum for Code 39

A checksum is an extra character which is added to the end of a barcode just before the stop character. The value of the checksum is computed from the preceding characters in the barcode, so it will change depending on the data contained in the barcode. The software that creates the barcode is responsible for performing the calculation and adding the checksum character. The scanner reads the barcode, performs the same checksum calculation, and compares the result of this calculation to the checksum at the end of the barcode. If the two do not match, the scanner presumes that something is wrong and does not accept the scan.

In practice, the Modulo 43 checksum is seldom used. While it does provide an additional level of reliability, Code 39 has other checks built into its structure that assure a level of accuracy more than adequate for most applications. A Code 39 barcode is presumed not to include a checksum unless explicitly required. To calculate a Modulo 43 checksum, first assign each character in the barcode a numeric value according to the following table.

Char	Value	Char	Value	Char	Value
0	0	F	15	U	30
1	1	G	16	V	31
2	2	H	17	W	32
3	3	I	18	X	33
4	4	J	19	Y	34
5	5	K	20	Z	35
6	6	L	21	-	36
7	7	M	22	.	37
8	8	N	23	Space	38
9	9	O	24	$	39
A	10	P	25	/	40
B	11	Q	26	+	41
C	12	R	27	%	42
D	13	S	28		
E	14	T	29		

Sum the numeric values of the characters in the barcode (exclude the start/stop characters) and divide the result by 43; the remainder is the checksum value. Convert this to a character using the table above and add that character to the end of the barcode, just before the stop character.

In programming parlance, dividing and taking the remainder as the result is a Modulo division. In Basic, it would be expressed as:

```
Checksum = MySum Mod 43
```

In C/C++ it would be:

```
Checksum = MySum % 43.
```